The importance of BIM in the lighting industry

Rosalind Pumphrey
BIM Manager
Eaton

Intro: Building Information Modeling
Building Information Modeling (BIM) is not a new concept, but rather one that is playing an increasingly larger role in building development. From design to construction, the concept of BIM has been a feature across many industries for nearly 30 years. It remains a strong and important player in the field because of its ability to allow designers to go beyond representing the physical space of a new or retrofitted building to the intrinsic properties of the structure as well.

While it has been around for decades, this process of creating three-dimensional (3D) intelligent models is becoming more of a requirement than an option for companies to provide to clients. According to The Business Value of BIM in North America, the percentage of companies using BIM increased from 2007 to 2012, from 17 percent to 71 percent respectively. This is not just a trend in the U.S., as BIM usage in China, Japan and Brazil is growing even faster – surpassing the 70 percent usage rate in North America.

Contractors, engineers and architects are the most common users of BIM, and this includes those who work in the lighting industry. In fact, like previous technology that can aid in building development, clients are increasingly seeking out companies offering BIM as a service.

The following paper will delve into the increasing importance of BIM usage, the changes of BIM over time and specifically how this affects the lighting industry.

Why BIM is Important
In general, BIM offers a variety of benefits:
• A single, consistent design showing several views of plans, sections and elevations.
• Different disciplines can work together on one model to coordinate building specifications.
• Up-to-date changes show various and comprehensive building schedules.
• Information can continuously be added from initial design through the construction phase to make ongoing maintenance and operations easy.

BIM makes it possible to accomplish more than simply designing a new building; it also plans for years of use. This is because designing, scheduling, constructing and evaluating a building is done in the BIM model long before any construction actually takes place. This gives designers and planners the tools needed to ensure the best products are used for the project.
By entering information about the lighting fixtures used, such as the type, size and photometric data, to name a few, users can perform an energy analysis for simulation through the software. This can help clients make more informed decisions about the fixtures they choose for their space. Additionally, BIM has the ability to render engines, specify taxonomy, and create model components which gives users the opportunity to view the entire 3D representation, as well as sections of the model.

BIM is also able to provide real-time coordination between industries, which makes it possible to see how other team members working on the project are changing and adapting their tasks and how it affects lighting design. This makes it easier in the long run to make choices and finalize decisions earlier in the design process than traditional methods.

This relative ease of lighting design makes BIM even more functional for users. Designers are given the rendering tools needed to complete model visualization and energy assessments sooner and more easily than ever before.

**Little BIM vs. Big BIM**

There is a distinction that needs to be made between a Building Information Model and Building Information Modeling. These two are sometimes also referred to as Little BIM and Big BIM.

While the model itself is called a Building Information Model, the continued use after the building’s construction has been completed is called Building Information Modeling. This means that once the building is occupied, the process of modeling continues to keep building operations going.

To put it more simply, a Building Information Model (Little BIM) is used to develop a new building while Building Information Modeling (Big BIM) is a representation that continues to monitor the structure after it has been completed.

**BIM and the Lighting Industry**

It is common knowledge that when designing a building, the lighting of the new or retrofitted structure needs to be taken into account. As the budgets of firms continue to shrink and project deadlines need to be coordinated with always-evolving technology and stricter government policies, it is becoming increasingly important to offer advanced options. This includes providing energy- and cost-efficient lighting choices that maintain a high level of quality.

In order to give firms what they desire, BIM allows lighting professionals the ability to carefully consider where and how many light fixtures will be placed during the preliminary design stage. As more specifics are decided upon, further information can be added to the model, such as lighting values of light switches, daylight sensors and occupancy sensors, as well as any additional recessed, suspended or surface mounted lights.

**Level-based or Face-based**

There are multiple locations within a BIM model where fixtures can be placed or hosted, including the wall, ceiling and floor. With these placements, there are two options used for a light fixture model.

The first option is level-based, which makes the fixtures independent of any changes in the architecture. For instance, if the height of a wall changes, the location and height of the corresponding fixture remains in its original position.

The second and most preferred option is face-based, which makes the fixtures dependent upon the architecture, even if it’s a linked model. An example here would be if a wall were shifted to a new location in the model. In a face-based approach, all the associated lighting fixtures would move in conjunction.

**Daylighting**

An important consideration when planning lighting design is daylighting. By looking at how much natural light is coming into a space, designers can better plan for artificial lighting. Light from windows, glazed openings and skylights can be utilized to create a more aesthetically pleasing space and should be coordinated with internal lighting fixtures as well as synchronizing artificial lighting fixtures. With the ability to measure natural light in a BIM model, designers can make decisions based on daylighting, such as installing dimmable fixtures, ballasts and controls to supplement incoming light.

**Using Building Information Modeling in Facilities Management**

As mentioned previously, Big BIM is the process of monitoring a structure post-occupancy. In this way, BIM can be a useful tool that goes beyond acting as a simple representation of a building to an active player in keeping the structure operating smoothly.

By utilizing BIM to aid in building operations through Integrated Project Delivery (IPD) – an approach integrating people, systems and businesses – facility managers are better able to take a more interactive, virtual approach to building management.

Because of this integrated information, BIM can continue to provide useful information and data throughout the life of the building. This means the data of the expected lighting and energy performance can be compared to the data showing the actual lighting performance and energy consumption over time. This is a valuable tool for facilities management and may help them decide whether to keep the building operating as is or figure out how things can or should be altered.

**Looking to the Future**

Because BIM software and technology continues to grow and become adopted by more architects, design-build firms, contractors, surveyors, engineers and others, there are several large-scale building projects and clients using BIM. For instance, the Freedom Tower in New York City, the Sydney Opera House retrofit in Australia and the U.S. General Services Administration all used Building Information Modeling software for design and operational purposes.

While there have been a plethora of advancements in BIM software over the years, it is important to note that nothing can replace the knowledge and expertise of a trained lighting professional. However, as building designs are becoming increasingly intricate and complex, the need for BIM will only increase. To ensure clients are getting the ideal amount of the correct style of lighting prior to installation, professionals in the lighting industry will soon be expected to be well-versed in BIM modeling, capabilities and services.

To help designers throughout the planning process, Eaton offers BIM models for more of its products than any other lighting manufacturer. These BIM models are filled with intelligent information and data in order to provide seamless integration of Eaton’s lighting products into designs easily and without cost.

Making intelligent content easily accessible to the entire design team, BIM provides revisions early in the lighting design phase. Implementing BIM enhances the outcome of projects big and small, and as the technology becomes more common, it will only become more powerful and advanced. Eaton’s investment in a professional staff to develop and support BIM models is just one example of the company’s commitment to being the lighting industry BIM leader. Eaton’s BIM-friendly models are created in Autodesk Revit and are compatible with multiple CAD formats, Bentley AE/CSim Building Designer (via Bentley RFA Interpreter) and others.
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